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Dated: January 23, 2009  
Electronic Signature for Duane C. Ulmer: /Duane C. Ulmer/

Docket No.: 63573A US  
(PATENT)

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
Verena M.T. Thiede

Application No.: 10/588,347

Confirmation No.: 7117

Filed: August 3, 2006

Art Unit: 4131

For: A URETHANE-MODIFIED ISOCYANATE  
COMPOSITION AND POLYURETHANE  
PRODUCT THEREFROM

Examiner: M. L. Leonard

### **AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION**

MS Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

### **INTRODUCTORY COMMENTS**

In response to the Office Action dated October 27, 2008, please amend the above-identified U.S. patent application as follows:

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.

**Remarks/Arguments** begin on page 6 of this paper.

**AMENDMENTS TO THE CLAIMS**

- 1) (Original) A urethane-modified isocyanate composition having an isocyanate content of less than about 15 weight percent and which comprises the reaction product of:
- a) a stoichiometric excess of an aliphatic or aromatic polyisocyanate, or mixtures thereof; with
  - b) a polyol composition that comprises (i) 0.5 to 50 percent by weight or more of at least one nitrogen-containing polyether polyol having a molecular weight of from 1000 to 12000 obtained by alkoxylation of at least one initiator molecule of the formula



wherein n and p are independently integers from 2 to 6,

A at each occurrence is independently oxygen, nitrogen, sulfur or hydrogen, with the proviso that only one of A can be hydrogen at one time,

R is a C<sub>1</sub> to C<sub>3</sub> alkyl group,

m is equal to 0 when A is hydrogen, is 1 when A is oxygen or sulfur, and is 2 when A is nitrogen, or



where m is an integer from 2 to 12 and

R is a C<sub>1</sub> to C<sub>3</sub> alkyl group,

and (ii) the remainder of the polyol composition is an additional polyol having a nominal hydroxyl functionality of 1.6 to 8 and a molecular weight of 1000 to 12,000,

and the polyol composition contains an oxyethylene content of greater than 25 percent by weight.

2) (Original) The isocyanate composition of Claim 1 having an isocyanate content of from 2 to 12 weight percent.

3) (Original) The isocyanate composition of Claim 1 wherein the polyisocyanate is an aromatic polyisocyanate.

4) (Original) The isocyanate composition of Claim 3 wherein the aromatic polyisocyanate comprises a toluene diisocyanate or a methylene diphenylisocyanate.

5) (Original) The isocyanate composition of Claim 4 wherein the aromatic polyisocyanate comprises 2,4'- and 4,4'- methylene diphenylisocyanate in a molar ratio of from 25:75 to 80:20.

6) (Original) The isocyanate composition of Claim 5 wherein the polyol b(i) is derived from an initiator of Formula I.

7) (Original) The isocyanate composition of Claim 6 wherein A at each occurrence in Formula I is nitrogen.

8) (Original) The isocyanate composition of Clam 7 wherein the compound represented by Formula I is 3,3'-diamino-N-methyldipropylamine, 3,3'-diamino-N-ethyldipropylamine, 2,2'-diamino-N-methyldiethylamine.

9) (Original) The isocyanate composition of Claim 6 wherein A at each occurrence in Formula I is oxygen.

10) (Original) The isocyanate composition of Claim 9 wherein one A in formula I is oxygen and the other A is nitrogen.

11) (Original) The isocyanate composition of Claim 10 wherein the compound represented by Formula I is N-(2-hydroxyethyl)-N-methyl-1,3-propanediamine, or N-(2-hydroxyethyl)-N-methyl-1,2- ethanediamine.

12 (Original) The isocyanate composition of Claim 1 wherein the compound represented by Formula I is 3,3'-diamino-N-methyldipropylamine or N-methyldipropanolamine.

13) (Original) The isocyanate composition of Claim 1 wherein the polyol b(i) is derived from an initiator of Formula II.

14) (Original) The isocyanate composition of Claim 13 wherein the nitrogen-containing polyether polyol constitutes from 1 to 25 weight percent of the polyol composition.

15) (Original) An urethane-modified isocyanate composition having an isocyanate content of from 2 to 12 weight percent and which comprises the reaction product of:

- a) a stoichiometric excess of an aromatic polyisocyanate comprising 2,4'- and 4,4'-methylene diphenylisocyanate in a molar ratio of from 25:75 to 80:20; with
- b) a polyol composition which comprises: (i) from 1 to 50 weight percent, based on weight of the total polyol composition, of a polyether polyol having a molecular weight of from 1000 to 12000 obtained by alkylation of 3,3'-diamino-N-methyldipropylamine or N-methyldipropanolamine; and (ii) from 99 to 50 weight percent of one or more polyether polyols that has an average nominal hydroxyl functionality of from 1.6 to 8; a molecular weight of from 1000 to 12000; and the polyol composition has at least 30 percent by weight of oxyethylene groups.

16) (Original) An urethane-modified isocyanate composition having an isocyanate content of from 2 to 12 weight percent and which comprises the reaction product of:

- (a) a stoichiometric excess of an aromatic polyisocyanate comprising toluene diisocyanate; and
- (b) a polyol composition which comprises: (i) from 1 to 50 weight percent, based on weight of the total polyol composition, of a polyether polyol having a molecular weight of

from 1000 to 12000 and obtained by alkoxylation of 3,3'-diamino-N-methyldipropylamine or N-methyldipropanolamine; and (ii) from 99 to 50 weight percent of one or more polyether polyols that has an average nominal hydroxyl functionality of from 1.6 to 8; a molecular weight of from 1000 to 12000; and the polyol composition has at least 30 percent by weight of oxyethylene groups.

17) (Original) A hydrophilic polyurethane polymer prepared by bringing together water and an isocyanate composition as claimed in Claim 1.

18) (Original) A process for making a hydrophilic polyurethane foam comprising mixing together an aqueous phase with an isocyanate composition as claimed in Claim 1.

19) (Original) A process for making a hydrophilic polyurethane gel comprising mixing together an aqueous phase with an isocyanate composition as claimed in Claim 1.

20) (Original) A horticultural growing medium comprising an urethane-modified isocyanate composition as claimed in Claim 1 and at least one filler material obtained by mixing the filler with the isocyanate composition and applying water to the resulting blend to form a growing medium.

21) (Canceled)

## **REMARKS**

### **Pending Claims**

Claim 1-20 remain pending in the present application. Claim 21 is cancelled per the claim amendments above.

## **ARGUMENTS**

### **Rejection of Claim 21 under 35 USC §112 and §101.**

Claim 21 is rejected under 35 USC §112 and §101 as the claim is alleged to disclose a use without method/process applicant is intending to encompass.

Claim 21 is canceled above obviating this rejection.

### **Rejection under 35 USC 103**

Claims 1-20 stand rejected under 35 USC 103(a) as unpatentable over Waddington et al. (WO 01/58976, corresponding to US Patent 6,032,412 in view of Bohne et al, (US Patent 6,032,412). Waddington et al. is cited as disclosing the initiators used in the present inventions; general teaching polyols produced with such initiators can be made into prepolymers; and the general statement polyols with a high level of ethylene oxide will be hydrophilic and may be prone to catalyze the water-isocyanate or urea reaction.

Bohne et al. is cited as disclosing a liquid NCO prepolymer having a maximum NCO content of 15% by weight using a polyether polyol with an average molecular weight of 250 to 12,000 g/mole.

The references are combined by stating

..”it would have been obvious to a person of ordinary skill in the art to use a liquid NCO prepolymer having a maximum NCO content of 15% in Waddington’s experiment because they both use the same polyol composition, isocyanate and they both are applying the polyurethane compositions to a substrate for coating (Waddington, Column 20, line 57-60) or molded bodies for humus-containing plant substrates (Bohne, Column 5, lines 22-25). Waddington discloses that higher %NCO prepolymers have a higher reactivity with regards to disturbances or variations caused by natural variations in the composition of certain substrates (Column 1, lines 45-50). The lower %NCO prepolymer would be less likely to react with the coated substrates or the humus-containing plant substrate (Waddington, column 2, lines 2-6.)”

This rejection is respectfully traversed.

It should be initially noted there is not disclosure in Bohne et al. of the initiators claimed in the present invention. Furthermore, neither Bohne et al. nor Waddington et al., disclosure prepolymers based on the present claimed invention with a polyol composition having the ethylene oxide content as presently claimed. Thus the assertion both references disclose the same polyol composition is factually incorrect.

The citation of Waddington et al, teaching the effects of low and high %NCO content of prepolymer is also factually incorrect. A reading to Waddington at Column 1, lines 45-50 and Column 2, lines 2-6 discloses nothing on the reactivity of prepolymers containing free NCO.

The prepolymers according to the present invention show an enhanced reactivity in the preparation of polyurethane polymers via reaction with water compared to prepolymers based on high ethylene oxide contains polyol, see Comparative A with respect to Examples 1-3; and enhanced reactivity with respect to conventional aminopolyether polyols, see Comparatives B & C with respect to Examples 1-3.

The use of the specific aminopolyether polyols and their reactivity enhancing effect are not suggested by Bohne et al. Waddington et al, does discloses the aminopolyether polyols of the prepolymers, however is silent on the NCO content of less than 15 weight percent; and neither reference discloses the use of polyols for making a prepolymer where the ethylene oxide content is greater than 25 weight percent.

Thus a combination of Bohne et al. with Waddington et al, fails to teach or lead one to the present inventions and further fails to teach the reactivity enhancing properties of the observed prepolymers.

As Claims 2-20 are dependent on Claim 1 and Claim 1 is novel and non-obvious over the art, it is asserted claims 2-20 are also non-obvious.

In view of the above amendment, applicant believes the pending application is in condition for allowance. For any remaining issues regarding the present application, Applicant's attorney can be reached at the phone number given below.

Dated: January 23, 2009

Respectfully submitted,

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